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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/993,897	11/27/2001	Masayuki Fukumi	829-590	7681

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EXAMINER

ROMAN, ANGEL

ART UNIT

PAPER NUMBER

2812

DATE MAILED: 09/30/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/993,897

Applicant(s)

FUKUMI, MASAYUKI

Examiner

Angel Roman

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 07/18/02.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1, 2 and 6-11 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1, 2 and 6-11 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 27 November 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☒ The proposed drawing correction filed on 18 July 2002 is: a) ☒ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s) _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1, 2, 7 and 9-11 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by Slater et al. U.S. Patent 5,089,431.

Slater et al. discloses a semiconductor substrate device, comprising; a first semiconductor substrate 1 including a concave-convex surface (see figure 3); and a second semiconductor substrate 11 having a thin film silicon insulator 14 on a surface thereof, wherein the first semiconductor substrate and the second semiconductor substrate are brought together so that the concave-convex surface of the first semiconductor substrate and the thin film insulator provided on the surface of the second semiconductor substrate contact each other to form a cavity in the semiconductor substrate device (see figure 8). The concave-convex surface of the first semiconductor substrate is defined by a plurality of convex portions formed at equal intervals wherein width(s) of the concave portions narrows as the depth of the concave portions increases (see figure 1).

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3. Claims 1, 2, 8, 10 and 11 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by Kurtz et al. U.S. Patent 5,286,671.

Kurtz et al. discloses a semiconductor substrate device, comprising; a first semiconductor substrate 1 including a concave-convex surface (see figure 5); and a second semiconductor substrate having a thin film silicon oxide insulator 33 on a surface thereof (see figure 7), wherein the first semiconductor substrate and the second semiconductor substrate are brought together so that the concave-convex surface of the first semiconductor substrate and the thin film insulator provided on the surface of the second semiconductor substrate contact each other to form a cavity in the semiconductor substrate device (see figure 8). The concave-convex surface of the first semiconductor substrate is defined by a plurality of convex portions formed at equal intervals wherein width(s) of the concave portions narrows as the depth of the concave portions increases (see figure 5).

4. Claim 6 is rejected under 35 U.S.C. 102(b) as being anticipated by Doyle et al. U.S. Patent 5,863,832.

Doyle et al. discloses a semiconductor substrate device, comprising; a first semiconductor substrate including a concave-convex surface; and a second semiconductor substrate having a thin film oxide insulator 222 on a surface thereof, the surface of the second semiconductor substrate on which the thin film oxide insulator is provided being implanted with hydrogen ions (see figure 5b), wherein the first semiconductor substrate and the second semiconductor substrate are brought together

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so that the concave-convex surface of the first semiconductor substrate and the thin film oxide insulator provided on the ion implanted surface of the second semiconductor substrate contact each other to form a cavity in the semiconductor substrate device (see figure 5c).

5. Claims 1, 2, 7, 9 and 11 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by Terasawa U.S. Patent 5,930,651.

Terasawa discloses a semiconductor substrate device, comprising; a first semiconductor substrate including a concave-convex surface (see figure 1); and a second semiconductor substrate having a thin film silicon insulator 20 on a surface thereof (see figure 1), wherein the first semiconductor substrate and the second semiconductor substrate are brought together so that the concave-convex surface of the first semiconductor substrate and the thin film silicon insulator provided on the surface of the second semiconductor substrate contact each other to form a cavity in the semiconductor substrate device (see figure 2). The concave-convex surface of the first semiconductor substrate is defined by a plurality of convex portions formed at equal intervals (see figure 1).

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

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invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1, 2 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kurtz et al. U.S. Patent 3,924,322.

Kurtz et al. discloses a semiconductor substrate device, comprising; a first semiconductor substrate 10 including a concave-convex surface defined by a plurality of convex portions 31-35 formed at equal intervals (see figure 1D); and a second semiconductor substrate 45 having an insulating film 40 on a surface thereof, wherein the first semiconductor substrate and the second semiconductor substrate are brought together so that the surface of the first semiconductor substrate 10 and the insulating film 40 provided on the surface of the second semiconductor substrate 45 contact each other to form a cavity in the semiconductor substrate device (see figure 1F). Kurtz et al. also describes the insulating film 40 as being a glass sheet or layer (see column 5, lines 47-49).

Kurtz et al. is applied as above but lacks anticipation on describing the insulating film 40 as being a silicon oxide thin film insulator. It is well known in the art that glass is conventionally a deposited film of silicon dioxide with additives to adjust coefficient of thermal expansion, color, conductivity, and melting point, generally doped with boron or phosphorus or both; therefore it would have been obvious to a person having ordinary skills in the art at the time the invention was made to describe the insulating film 40 as being a silicon oxide thin film insulator in the primary reference of Kurtz et al. since the glass sheet in Kurtz et al. is conventionally a silicon oxide thin film insulator.

Response to Arguments

3. Applicant's arguments with respect to claims 1 and 2 have been considered but are moot in view of the new ground(s) of rejection.

4. Applicant's arguments filed 07/18/02 have been fully considered but they are not persuasive. Applicant argues that Kurtz et al. fail to disclose or suggest a semiconductor substrate having a thin film insulator, as explain above in paragraph 3 the insulating glass layer 40 in Kurtz et al. can be considered by a person having ordinary skills in the art as being a thin film insulator, therefore Kurtz et al. disclosed a semiconductor substrate having a thin film insulator.

Conclusion

5. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Kurtz et al. (5,543,349), Hays, Riseman, Drake et al., Ohara et al., Blackstone, Lott et al. and Chang et al. disclose semiconductor devices comprising enclosed concave-convex surfaces therein. Aspar et al. disclosed a method of producing a thin layer of semiconductor material using hydrogen ions.

6. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).


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7. A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Angel Roman whose telephone number is (703) 306-0207. The examiner can normally be reached on Monday-Friday 8:30am-6:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John Niebling can be reached on (703) 308-3325. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7724 for regular communications and (703) 308-7724 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-1782.


John F. Niebling
Supervisory Patent Examiner
Technology Center 2800

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September 24, 2002